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CURRENT LITERATURE

BOOK REVIEWS

Recent textbooks

IN THE PREFACE of his *Principles of botany*[1] CHODAT announces that he intends to present a résumé, as concise as possible, of the general principles of botany, which presupposes of its readers such scientific preparation as is given in the secondary schools of France and Switzerland, i. e., the rudiments of natural and physical sciences. While attempting to state the facts in the precise language of physics and chemistry, he wishes readers to recognize that the phenomena are not reducible to the simple (*sic*) terms of these sciences. Not content with presenting only facts and definite theories, he calls attention to the unsolved problems as a stimulus to study. CHODAT disclaims the intention to write a treatise or a dictionary of botany, and limits his choice to those principles about which others may be conveniently and logically grouped. Keeping in mind the author's intention, we inquire how the book conforms to it.

In the first place, it is not so extensive as the number of pages would indicate. It is liberally and well illustrated, many of the figures being original and all on a rather large scale. Then the text is very open, much broken by paragraphing, a single sentence, sometimes one of only three or four words, commonly constituting a paragraph. That necessitates much more brevity than would be expected in 744 pages.

The book opens with the section on general physiology, in which are discussed the constitution of living matter and the acquisition and transformations of energy. In general this section covers the physics and chemistry of plants, arranged in somewhat novel fashion. Part of the chapter, as the discussion of the ionic theory, is thoroughly modern, but so condensed as to be far beyond the grasp of one who does not already know a good deal of physical chemistry; part, on the contrary, such as the distinctions in kinds of radiant energy, conforms to the current, though long outgrown, phraseology.

After a section on the cell and the tissues, including chapters on the cell, organogeny, and anatomy, the third section appears as special physiology. Here the chapters treat of "functions of elaboration" (including in this term, curiously enough, transpiration and the circulation [*sic*] of water and foods, but not photosynthesis; growth in the abstract, but not growth directed or controlled by external agents), "functions of relation," and "reproduction." The chapter on functions of relation discusses the responses to stimuli, formative and directive.

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[1] CHODAT, R., Principes de botanique. 8vo. pp. viii+744. *figs. 829.* Genève: Georg et Cie. 1907.

In general the treatment of the physiological topics seems to us to lack balance. For example: twenty-four pages are devoted to climbing and twining plants, about as much as is given to tropisms in general and to the special phenomena of geotropism and phototropism, while all the others have a scant two pages; transpiration is given nine pages, but growth is dismissed in six; the enzymes are treated in sixteen pages, while photosynthesis with all its mechanism, energetics, and chemistry has scarcely eighteen, and proteid synthesis is allowed less than four. Further, the logical arrangement does not commend itself to us. Is there any sound reason for the curious distribution of topics already noted, or for treating the responses of "carnivorous plants" independently, and for combining with them the consideration of mycorhizal plants? If there is, the author has not made it evident in the text.

The section on reproduction (167 pp.) brings together in unusual form the usual data suggested by the title, each topic including illustrations from the whole plant kingdom. The presentation may be indicated by the principal topics, which are as follows: multiplication by division; multiplication by budding; multiplication by spores and zoospores; origin of spores in the Archesporeae and sporophyte of bryophytes; amphimixis, gametes, and gametangia; sporogenesis in the pteridophytes and spermaphytes; origin and development of megaspores; fecundation in spermaphytes; chromatic reduction; sexuality; secondary sexual characters; flowers of angiosperms; floral polymorphism; parthenogenesis; effects of fecundation; seeds; fruits; dissemination; germination. Some of the terminology used is revolutionary. For instance, in groups above thallophytes the mother cells are "tetrasporangia," the structure bearing sporangia is an "archidium" (the nucellus being a "megarchidium"), etc.

The last section deals with phylogeny, one of the chapters discussing variation and heredity, the other presenting the various theories of the origin of species.

The book seems not to offer the logical and balanced presentation that is essential to elementary students and therefore not to be well adapted to those for whom it is designed. At the same time, in its general facts and theories, as well as in the clear recognition of our ignorance in many fields, it is reliable, and its clear style makes it attractive.—J. M. C. and C. R. B.

LOTSY[2] has undertaken a gigantic task in preparing and publishing his lectures on the phylogeny of plants for the use of students of taxonomy. The first volume, devoted to the algae and fungi, makes a work of over 800 pages, illustrated by half-tones of 430 charts, each containing one to thirty figures; and he plans two other volumes covering in like manner the "archegoniates" and the spermaphytes. When one remembers that he has in hand the completion of his voluminous treatment of the theories of descent (*Vorlesungen über Deszendenztheorien*) and the editorial oversight of the *Botanisches Centralblatt*, in itself no mean task, one is in doubt whether to wonder most at his capacity or his temerity.

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[2] LOTSY, J. P., Vorträge über botanische Stammesgeschichte, gehalten an der Reichsuniversität zu Leiden. Ein Lehrbuch der Pflanzensystematik. Erster Band: Algen und Pilze. Imp. 8vo. pp. iv+828. *figs. 430.* Jena: Gustav Fischer. 1907. *M*20.

This work consists of an orderly account of the structure and life-history of selected species of various groups, which illustrate best the progression or regression along developmental lines, so far as available literature presents it. Especially, LOTSY endeavors to distinguish the sporophyte and gametophyte generations, or as he calls them on the criterion of chromosomes the x and $2x$ generations. Developmental features of nutrition, cytology, and reproduction are treated in connection with forms that suggest the topic.

Avowedly, the work is a compilation of current literature, and it would be too much to expect that it contain no errors nor oversights. An inspection, with special reference to the work of Americans, reveals an unexpected and welcome completeness, so far at least as the major papers are concerned, and this is probably equally true of the European literature. The work is indeed a thesaurus of information, and its treasures are made thoroughly available by a very complete index. There is no doubt that the hope of the author will be amply fulfilled: "Should the book win new friends for taxonomy, or give young investigators a better insight into the live questions of classification, or even save one or another some labor and so give more time to new investigation, the author will be requited for his trouble."—C. R. B.

A SECOND EDITION of CAMPBELL'S *University textbook of botany*, "revised and corrected," has appeared.[3] There is no prefatory note to call attention to the revised portions of the book, and since the pagination of the two editions is identical, it is evident that only such revision was attempted as could be made upon the stereotyped pages. Just what these changes are could be discovered only by a laborious comparison of the two texts. The first edition, which reappears in this second edition, was reviewed in this journal (34:67. 1902). The call for a second edition indicates that there is a demand for a general textbook of botany of college grade.—J. M. C.

A SECOND and much enlarged edition of KRAEMER'S *Textbook of botany and pharmacology* has appeared.[4] The book represents what is demanded of students of pharmacy in the way of botanical information. The three parts of the volume bear the titles Botany (416 pp.), Pharmacognosy (381 pp.), and Reagents (8 pp.). The botanical section presents the principal groups of plants, from thallophytes to spermaphytes, in such an account as would be given in a short course in elementary morphology; the "outer morphology" of angiosperms; the "inner morphology" or histology of the higher plants, including the cell contents; a classification of angiosperms yielding drugs; the cultivation of medicinal plants. If the general anatomical and morphological features of plants as presented in the text are backed up by laboratory work, the student of pharmacy will obtain a good introduction to the scientific aspects of botany before he reaches the professional details as to drugs. The illustrations are well selected and admirably executed.—J. M. C.

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[3] CAMPBELL, DOUGLAS HOUGHTON, A University textbook of botany. Pp. xv+579. New York and London: The Macmillan Company. 1907. $4.00.

[4] KRAEMER, HENRY, A textbook of botany and pharmacognosy. pp. vi+840. Philadelphia and London: J. B. Lippincott Company. 1907. $5.00.

BERGEN and DAVIS have prepared a manual[5] to accompany their *Principles of botany*, reviewed in this journal (43:64. 1907). As a guide to teachers not familiar with material or its use the manual should prove of great service. As in every other manual, a selective use of the material is expected, and hence almost any elementary teacher with almost any length of course and any kind of material may find helpful suggestions.—J. M. C.

NOTES FOR STUDENTS

Phototropism.—Exactly opposite results to those of HABERLANDT[6] have been reached by KNIEP[7] working in PFEFFER'S laboratory. By painting with paraffin oil the surface of leaves of a number of species cited by HABERLANDT in his *Lichtsinnesorgane* and covering this layer of oil with thin sheets of mica, or in the case of humpy leaves with thin paper, KNIEP eliminated the lens-action of the epidermal cells, to which HABERLANDT ascribes the perception of light. But whereas HABERLANDT in similar experiments, using water instead of oil for obviating the lens-action, found that the leaves do not respond to oblique light, KNIEP finds that they do, behaving just as the control plants without oil. KNIEP devised ingenious methods of shading the petiole completely, excluding even the light transmitted through the blade at the point of attachment of the petiole. He also adapted the method of conducting light through a glass rod, once proposed for microscope illumination, to the illumination of his experimental leaves.

The increasing number of squarely contradictory results in the field of irritable phenomena makes it evident that there is need of more cautious analysis of the possible factors and more extended and careful experimentation before reaching and publishing conclusions.—C. R. B.

Secondary thickening.—Last year URSPRUNG published a preliminary note in the *Berichte* of the German Botanical Society,[8] declaring that the pith in *Sambucus nigra* continued its growth in the second and third year, and that even the wood cells were capable of dividing and increasing the thickness of their walls as well as their diameter. Although it is a well-known fact that these cells are all dead, SCHELLENBERG[9] goes to the trouble of demolishing URSPRUNG'S foolish allegations in all sobriety and with all the enginery of original research. As URSPRUNG gave measurements which might have misled, perhaps this ponderous refutation was necessary; but it has its humorous aspect.—C. R. B.

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[5] BERGEN, JOSEPH Y., and DAVIS, BRADLEY M., Laboratory and field manual of botany. pp. viii + 257. Boston: Ginn and Company. 1907.

[6] BOT. GAZETTE 42:399. 1906.

[7] KNIEP, HANS, Ueber die Lichtperzeption der Laubblätter. Biol. Centralbl. 27:97–106, 129–142. *figs. 28*. 1907.

[8] URSPRUNG, A., Ueber die Dauer des primären Dickenwachstums. Ber. Deutsch. Bot. Gessells. 24:493. 1906. Cf. BOT. GAZETTE 43:294. 1907.

[9] SCHELLENBERG, H. C., Ueber das primäre Dickenwachstum des Markes von *Sambucus nigra*. Ber. Deutsch. Bot. Gesells. 25:8–16. 1907.